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dunes of Lake Michigan,' pp. 167-202, with eight photographs. This very complete ecological study of the dune floras is continued from the February number. A special feature of this part is the discussion of embryonic dunes. The active or wandering dunes are also taken up and will be completed in a subsequent number. The following briefer articles appear: Ralph E. Smith: 'A new *Colletotrichum* disease of the Pansy'; E. J. Hill: 'A new biennial-fruited oak,' with two plates; Elias Nelson: 'The Wyoming species of *Antennaria*,' in which eight new species are described. Numerous Book Reviews and Notes for Students complete the number.

SOCIETIES AND ACADEMIES.

ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

THE 289th regular meeting of the Anthropological Society was held Tuesday, March 28, 1899. Dr. J. Walter Fewkes made a communication on the 'Winter Solstice Altars at Hano,' a Tewan pueblo in Tusayan. He began by saying that the Territory of Arizona is covered with mounds or ruins indicative of the habitations of prehistoric pueblo people, but that it is evident that these villages were never simultaneously inhabited. Their distribution shows that this agricultural, aboriginal population of Arizona was more evenly distributed over the Territory in ancient times than at present. The presence of nomadic enemies—Utes, Apaches, Navajos and others—had led to a concentration of the pueblo aborigines of this region into limited areas, a movement which began in the 15th century and was continued in the two following. The so-called province of Tusayan was one of those centers of concentration or refuge, and the inhabited pueblos of the area now contain some of the descendants of the survivors of the abandoned villages between the Mojollones Mountains and the Utah boundary.

Three of these Tusayan pueblo—called Walpi, Siteomori and Hano—are situated on one mesa, not more than a gunshot apart. Dr. Fewkes showed how Walpi had been founded by clans driven southward from the Colorado River, and how their pueblo had grown by successive incoming clans from south and east. At the end of the 17th century the hostile nomads had so

closed in on Walpi that they swarmed in their farms, and utter annihilation stared the Hopi in the face. The Governor of Walpi sent to New Mexico for help, and after four appeals a band of Tewa warriors from a pueblo in the upper Rio Grande valley went to his aid. These warriors drove back the Utes, and in return for this help, the Tewa were given a site for their home near the main trail to the mesa upon which Walpi is situated. The village which they built is now called Hano. For two centuries the successive generations of inhabitants of Hano have remained Tewan in their customs in the country of their adoption. Hano preserves the Tewan language, although, by marriage with the neighboring Hopi, the consanguinity of the inhabitants is more Hopi than Tewa. Similarity of language is not always a sign of blood kinship. There are also many Tewan customs in marriage, mortuary and other rites in Hano, but the most characteristic of all are the religious festivals. The most instructive of these are the winter-solstice rites.

Of all expressions of religious sentiment objects like fetishes and ceremonial paraphernalia are the least variable from generation to generation. Mythology changes as man advances in culture or lives in a new environment, and accretions in form of myths to adjust worship to the spirit of the times multiply from generation to generation. Expression of the religious feeling through acts or dramas called ceremonies is more conservative than through myth and less modified by the evolution of culture, and new myths are invented to harmonize and explain ceremonies handed down from ancient times. The objects used in worship—fetishes, idols, paraphernalia—change even less than rites or myths, and reflect better than both the true ancient religious sentiment of which they are expressions, and are, therefore, of preeminent importance to the ethnologist in the study of ethnographic religion.

These ceremonial objects are very numerous among the Hopi; and their installation in sacred rooms, at times of great ceremonies, is called an altar. The two altars at Hano during winter-solstice rites were described in detail. The most striking fetishes upon them were clay images of the Great Snake. There were also

rain-cloud symbols, gaming implements, water-worn stones, puma paws and other objects. The imitation of an ancient ladder which stood back of the altar was called a sun-ladder, and was interpreted as a symbolic aid to the sun, who is supposed to be weary at the winter solstice. Through sympathetic magic he is thus supposed to gain strength to mount the sky from his home at sunrise.

These altars at the winter-solstice ceremony in Hano made it possible to know something of the character of the ancient Tewan Sun and Snake worship, of which little has yet been recorded, although this pueblo stock has been, and still remains, one of the most important in the upper Rio Grande pueblos. Possibly studies of secret rites in the estufas of the latter will bring to light the characteristics of their winter-solstice altars, but it is also possible that these altars have been abandoned, in which case the survivals at Hano, described by Dr. Fewkes, have value in a comparative way, as indicating the nature of Tewan altars in mid-winter.

Mrs. Olive Ennis Hite presented a paper on 'New Mexican Folk-Lore,' in which she described the environment of these people and showed the influence it had upon their superstitions. Their belief in the 'Hombrecito,' or little brown people, was widespread, and it was considered lucky to see one of these creatures, who were visible to the 'pastores,' or shepherds, only. Of 'las brujas,' the witches, there is less said, and that little with many 'carambas' and audible supplications for the intervention of 'la Santissima Maria.'

Discussed by Drs. McCormick, Fewkes and Kober, Professor McGee, Dr. Wilson, Mr. Pierce and Miss Alice C. Fletcher.

J. H. McCORMICK,
Secretary.

GEOLOGICAL CONFERENCE AND STUDENTS' GEOLOGICAL CLUB OF HARVARD UNIVERSITY.

Students' Geological Club, March 14, 1899. Mr. A. W. Grabau reviewed the paper which Professor Shaler has recently published on the Geology of Cape Cod (18th Annual Rep., U. S. Geol. Surv.). The speaker did not agree with the view advocated by Professor Shaler, that the topography of lower Cape Cod, from

Orleans to Highland Light, is mainly erosional and scarcely modified by ice action. But he held that the orientation of the valleys, the character of the slopes, and the presence of typical kettles all over the cape, indicate that most of the material of Cape Cod is of glacial origin.

Geological Conference, March 21, 1899. Mr. F. M. Buckland gave a paper on 'Winter Changes about Fresh Pond.' After briefly reviewing the literature on the expansion and contraction of ice on water bodies, he described some of the effects of these agencies on the shore of Fresh Pond during the past winter.

Mr. J. B. Woodworth presented some results of field observations on 'Moen's Cliff and the Maars of the Eifel.' The Cretaceous and Pleistocene beds of the island of Rügen, off the coast of Germany, and Moen, off the coast of Denmark, show a disturbance which is comparable in degree and character to that in the Cretaceous and Pleistocene of Martha's Vineyard. H. Credner attributes this deformation to the shoving action of an ice sheet which was immediately previous to the last. A few other geologists favor purely orogenic agencies. In neither case has conclusive physical evidence been found. The lantern views, which are recent accessions to the Gardiner Collection, illustrated this deformation and related features, and the Weinfelder and Gemündener Maars near Daun.

J. M. BOUTWELL,
Recording Secretary.

TORREY BOTANICAL CLUB, FEBRUARY 28, 1899.

PROFESSOR L. M. UNDERWOOD presented a paper on 'Species confused under the name *Aspidium juglandifolium*,' discussing the characters and geographical district of the forms regarded by him as distinct species, eight in all, constituting the whole number attributed to the genus *Phanerophlebia*. He remarked in concluding that it would be unsafe to describe new species without consulting the valuable collections of ferns in Europe, and especially at Kew. The paper will appear in the *Bulletin*.

Miss Alice Lounsberry then exhibited the very valuable collections of flower paintings by Mrs. Ellis Rowan, which constitute the origi-

nals of the colored plates in Miss Lounsberry's forthcoming work, 'How to Know the Wild Flowers.' Selections which showed the character of the book were read, including the Introduction, written by Dr. Britton, and the Preface, which pointed out the fact that the distribution of plants according to soils was made the keynote of the work.

Dr. Britton said that the book was interesting to him on two accounts, from the ecological basis of classification and the remarkable reproductions in color.

In the absence of Mrs. Annie Morrill Smith, of Brooklyn, Mrs. E. G. Britton read for her the manuscript of a paper, entitled 'The Flora of the Adirondack Mountain Club Area.'

Meeting of March 14, 1899.—The Summer Courses in Botany given jointly by this Club and the College of Pharmacy were announced to begin at 4:30, March 24th, ending June 10th, the General Course to be given by Dr. H. H. Rusby, that in Histology by Dr. M. A. Howe.

The paper of the evening, by Mrs. Caroline A. Creevey, on 'Plant Juices and their Commercial Values,' described the secretions, oils, gums, resins and other products of plants, with exhibition of numerous specimens. Among the numerous oils considered none has become so important commercially as cotton-seed oil, now produced at about 28 million gallons per year, pressed from 800,000 tons of cotton seed. Another industry dependent upon plant juices is that of tanning, the tannin found in the saw-palmetto and in *Rumex hymenosepalus* promising to revolutionize the process of the leather-industry. The waste sands occupied by these plants in the South and West bid fair to become valuable.

Dr. Underwood exhibited a series of photographs of the Fleshy Fungi by Mr. G. A. Anderson, of Lambertville, N. J., colored from the living specimens by his daughter, Miss H. C. Anderson. They illustrate a new process of preserving fleshy fungi.

Dr. Britton reported a brief communication from Mr. A. A. Heller sent from Porto Rico, February 18th, reporting collections made about Ponce, Ibonito, Coamo, etc., now reaching 584 numbers after six weeks' work. On the north side of the islands many species occur on the

shore which are montane species when growing on the south side.

Dr. Britton also read from a letter of February 26th, just received from Mr. S. Henshaw, from San Juan, describing the sugar plantations, now in the midst of cutting and boiling. He finds the flora not so varied as in Trinidad; the woods are few; in 100 miles he did not see a single large tree.

EDWARD S. BURGESS,
Secretary.

DISCUSSION AND CORRESPONDENCE.

DUPLICATION OF GEOLOGIC FORMATION NAMES.

REFERRING to Mr. F. B. Weeks' letter on this subject in your issue of March 13th, I venture to doubt whether Cache Valley group (1879) or Cache Lake beds (1888) can properly be considered as conflicting with each other or with the name Cache Creek formation. If, however, regarded as an undesirable duplication of similar names, I wish to point out that the Cache Creek group or formation undoubtedly holds priority, a circumstance which would scarcely appear from Mr. Weeks' remarks.

The name was first applied (by Dr. Selwyn, in 1872) as Upper and Lower Cache Creek groups, to certain rocks in British Columbia. The age of the upper series was only conjectured, but the lower was known to occupy a position somewhere 'between the base of the Devonian and the summit of the Permian.' In 1876 Carboniferous fossils were found in rocks assigned to the lower group in the northern part of British Columbia, and in the following year a re-examination of the original area led to the discovery of similar fossils in both lower and upper groups there. In my report for 1877 these groups are, therefore, referred to collectively as the Cache Creek series. In the latest report dealing with these rocks the same usage is followed, although upper and lower parts of the Cache Creek series or formation are separately referred to.

It thus appears that the name in question has been consistently applied by the Geological Survey of Canada to the same terrane since 1873. Nor is it merely a 'horizon' of the Carboniferous, but a formation estimated at more than 9,000 feet in thickness. It includes, in